Amendment to the Specification

Please rewrite the first paragraph on page 1 as follows:

This ~~is a continuation~~ application claims priority to U.S. Provisional Application to ~~of~~ Ser. No.60/163,141, filed November ~~Filed Nov.~~ 2, 1999, and is a Continuation-In-Part of U.S. Patent Application Ser. No.09/022,950, filed February 12, 1998, now U.S. Patent No. 5,955,992.

Please rewrite the third paragraph on page 6 as follows:

Another benefit of CIMA is the ability to transmit and receive signals in non zero-phase space, which is an interference condition at one or more time instants within a symbol interval in which the carrier signals corresponding to one data symbol cancel where similar carrier signals corresponding to a different data symbol constructively combine. ~~Non-zero phase-space transmissions are undetectable by conventional receivers. However,~~ CIMA signals ~~in non-zero-phase space~~ are detectable by ~~CIMA~~ receivers that are tuned to the carrier frequencies and carrier-phase relationships of the carrier signals.

Please rewrite the last sentence on Page 12 as:

The objectives of the present invention recited above, ~~as well as~~ additional objects, and/or alternative objects depend on particular embodiments and applications of the invention, and are apparent in the description of the preferred embodiments.

Please rewrite the second and third paragraphs on page 28 as follows:

FIG. 3A shows a plurality of phase spaces 123, 125, 127, and 129. Phase space (which is described in PCT Appl. No. WO99/41871) is the phase relationship between different carriers. The zero-phase relationship 125 corresponds to ~~causes~~ a constructive interference signal (such as a pulse) positioned at a particular instant in time ~~to occur in the time domain~~. This enables the composite signal 130 to be detectable by a receiver (not shown) that does not adjust the phase of the individual carrier signals. Non zero-phase relationships, such as phase spaces 123, 127, and 129, correspond to a substantially zero ~~undetectable~~ composite signal 130. Windowing at either or both the transmitter 100 and the receiver 200 may reduce the sidelobes of the composite signal 130.

Although the composite signal 130 may have substantially zero amplitude in time intervals where there is a non zero-phase relationship between the carriers, the carriers still exist and therefore, the information signal represented by the constructive interference that occurs at zero phase exists in non zero phase. Recovery of the information signal from a non zero-phase sampling of the carriers (such as may be required due to chromatic dispersion in the propagation channel) may be achieved by ~~requires~~ phase shifting (or delaying) the carrier signals in order to construct a zero-phase relationship. ~~Non zero phase space may be used to transmit information that is undetectable except by receivers that are tuned to the carrier signals and provide a compensating phase shift to the received signals that enables reconstruction of the information signal.~~

Please rewrite the first paragraph on page 29 as follows:

multipath. Frequency diversity in CIMA reduces transmission-power and power-control requirements. ~~Reduced power requirements and non zero phase space transmissions enabled by the CIMA protocol enhances biological safety by reducing the impact of RF energy on biological systems and bio-chemical reactions.~~ CIMA enables simplified transmitter and receiver designs, and it enables the implementation of ultra-wideband CDMA by using ~~slow~~ parallel processing. The implementation of redundantly modulated multicarrier protocols in antenna arrays introduces new array-processing capabilities. Frequency diversity in redundantly modulated protocols introduces new types of spatial processing that do not require antenna arrays ~~and do not depend on the multipath environment~~.

Please make the following corrections to the third paragraph on page 42:

A reference source 217 produces a plurality of reference beams that are coupled into each nonlinear transmission medium 215A to 215B. A nonlinear process (such as second-harmonic generation) may be used to generate an information signal resulting from the interaction of the multicarrier signals and the reference beams. Other techniques for generating an information signal may be used instead, such as a threshold-power detection technique in which signals output from the preprocessors may excite a gain medium if the carriers are in phase. A detector, such as detectors ~~211A~~ 204A and ~~211B~~ 204B receives each of the information signals. The detected signals may be demodulated, decoded, and/or acted upon by an interference canceller (not shown).

Please rewrite the third paragraph on page 43 as follows:

Redundantly modulated multicarrier signals may be used as a multiple-access communication protocol such as CIMA, MC-CDMA, or an OFDM protocol that transmits data over multiple carriers. CIMA signals have advantageous transmission characteristics in a wireless environment. ~~CIMA signals have low-power transmission requirements and can be transmitted in undetectable phase spaces.~~ CIMA signals can be used to construct many different wireless protocols including GSM, other TDMA protocols, and CDMA. CIMA provides substantial improvements to system capacity, simplicity, and signal quality, and it greatly increases diversity benefits of conventional multiple-access protocols. CIMA also enables a simple transport-medium interface between optical-fiber and wireless transmissions because a wireless protocol constructed from multiple carriers does not require a protocol change at the interface. ~~Furthermore, the power efficiency of a high-diversity protocol like CIMA can eliminate the need for amplifiers in some applications.~~

Please rewrite the second paragraph on page 48 as follows:

FIG. 19 shows a time-domain representation of a plurality of frequency-domain encoded signals. Each pulse 1, 2, 3, 4, and 5 represents a CIMA signal having three (M=3) multi-frequency carrier signals. CIMA enables 2M ~~2M-1~~ quasi-orthogonal signals ~~$s_{n=2M-1}(t)$~~ in the time domain if data symbols modulated on the carrier signals are limited to binary phase shift key or amplitude modulation, whereas carrier processing yields only M equations. Since the quality of quasi-orthogonal signals can be improved using multi-user detection (which involves the same processes as interference cancellation), processing signals in a diversity-parameter domain that enables quasi-orthogonality of the signals being processed increases the capacity of the communication system. This realization may be extended to many different diversity-parameter domains. For example, many types of multicarrier-defined diversity-parameter domains (such as frequency) may be used to generate CIMA signals that can be processed in the time domain. One of the benefits of alternative diversity-parameter processing is that, in some cases, the benefits of both diversity and enhanced capacity can be obtained.